

REMARKS

Claims 1-4 and 7-10 are all the claims pending in the application.

On pages 2-3 of the Office Action, claims 1-4, 7 and 8 are rejected under 35 U.S.C. §103(a) as obvious over JP '411. In addition, on page 3 of the Office Action, claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '411 in view of JP '624 for the reasons of record.

Applicants respectfully traverse this rejection for the reason that JP '411 does not teach or suggest the process of producing nitrogen trifluoride of the present invention.

The Examiner asserts that it would not be unexpected that the use of a fluorine gas concentration of 3 mol % or less and a concentration of ammonia gas of 6 mol% or less in the diluting gas of JP '411. Basically, the Examiner appears to be taking the position that if the gases were analyzed, the concentration of fluorine would be 3 mol% or less and the concentration of ammonia gas would be 6 mol % or less.

JP '411 is completely silent regarding the fact that the gas concentration in the reactor is set within a range of preventing an explosion. JP '411 describes, in paragraph [0020], that "the concentration of the starting material blown into the reactor is not particularly limited. That is, the starting material may be diluted using a diluting gas along with the ammonia gas and the fluorine gas." See translation of [0019] to [0022] of JP '411 submitted herewith.

Therefore, JP '411 does not provide any motivation that would lead one of ordinary skill in the art to specifically select the claimed range. That is, JP '411 teaches that the concentration of gases is not particularly limited, and thus does not teach or suggest the necessity of setting the concentrations within a range in which an explosion can be

prevented.

In addition, in Example 1 of JP '411 a fluorine gas adjusted to a concentration of 36% and an ammonia gas adjusted to a concentration of 20%, by diluting with helium, were fed into the reactor at a proportion of 2.4:1. The concentrations in the reactor are, when converted, 25 mol % of fluorine gas and about 6 mol % of ammonia gas. Thus, the concentration of the fluorine gas is extremely high, i.e., significantly higher than the fluorine gas concentration of 3 mol % or less of the present invention.

Also, in Example 2 of JP '411, the concentration of the fluorine gas fed to the reactor was 20% and the concentration of the ammonia gas was 100%, and the proportion thereof was 3.0:1. Thus, the concentrations in the reactor when converted are 15 mol % of fluorine gas and about 25 mol % of ammonia gas. The gas concentrations of Example 2 of JP '411 are greatly higher than the concentrations of the present invention according to claim 1.

Thus, JP '411 does not disclose the gas concentration ranges of the present invention.

Further, since JP '411 does not disclose any advantage/benefit of using a specific concentration of the gases or that any advantage/benefit could be obtained by adjusting the concentration of the gases, JP '411 does not provide any technical motivation that would one of ordinary skill in the art to decrease the concentration of fluorine gas to 3 mol % or less.

Therefore, JP '411 does not teach or suggest the gas concentrations as defined in claim 1.

Moreover, each of claims 2-4 and 7-10 depend, directly or indirectly, from claim 1. Accordingly, it is respectfully submitted that these claims are patentable for at least the same reasons that claim 1 is patentable over the cited art.

In view of the above, withdrawal of the foregoing rejection is respectfully requested.

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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WASHINGTON OFFICE

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[2-255513 pg 2, right column]

In the present invention, when the reactor is installed in a heating medium that is maintained at 80 to 250°C, the reaction heat can be efficiently discharged through the heating medium, and therefore, it further prevents overheating of the reactor. In addition, the temperature of the internal wall of the reactor is always greater than the solidification temperature of the by-product, thus preventing blockage of the reactor. It is desirable for the temperature of the reactor to be 100 to 150°C.

[5-105411, column 1, lines 2-6]

(Claim 1)

A manufacturing method for nitrogen trifluoride characterized in that, when manufacturing nitrogen trifluoride by reacting fluorine gas and ammonia gas in their vapor phase, in the reactor, the material gases are run in a spiral along the internal wall of the reactor to mix and react the material gas.

[5-105411, column 3 line 45 to column 4 line 11]

(0019)

It is preferable for the material gases feeding to the reactor to be in a relationship of fluorine gas approximately 1 to 30 times, and more preferably, approximately 2 to 4 times the ammonia gas.

(0020) The concentration of the material gas feeding to the reactor is not particularly limited. In other words, it is acceptable to either dilute or not with a diluent gas for both the ammonia gas and fluorine gas. As long as the type of gas does not inhibit the main reaction, the type of diluent gas is not particularly limited.

(0021) The feeding speed of the material gas to the reactor is not particularly limited, and as long as the feeding speed is approximately 0.01 m/second or greater, there should be no problem.

(0022) The reaction temperature is preferably maintained from room temperature to 120°C, and in particular from 30 to 70°C, although it should be no problem as long as it is at or below the decomposition temperature of the nitrogen trifluoride. For that reason, a cooling device can be installed on the external surface or other portion of the reactor to remove the reaction heat as required.